

NOFB-Aerospike, Phase I

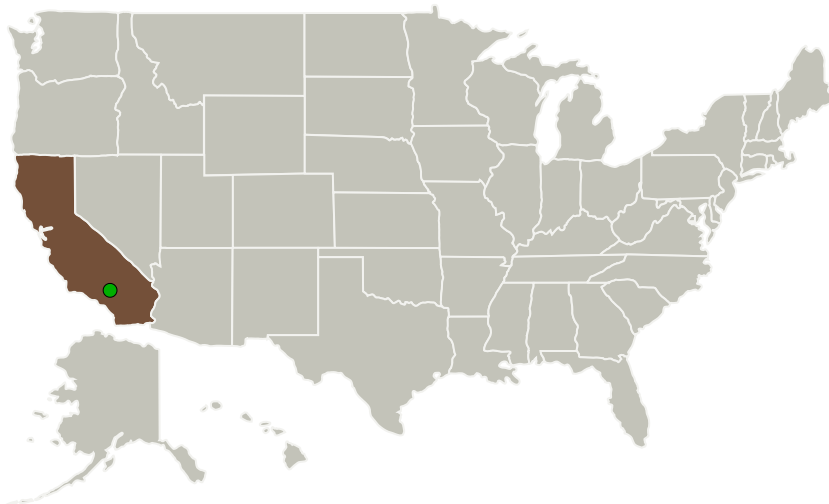
Completed Technology Project (2010 - 2010)



Project Introduction

We propose the research, development and testing of a clustered aerospike engine to eventually be utilized with our high performance NOFB (nitrous oxide fuel blend) monopropellant and combustion chamber designs (patents pending) for planetary ascent stages. Compared to existing systems, this monopropulsion system concept: 1) achieves bipropellant rocket performance in a compact, monopropellant system architecture; 2) is non-toxic to allow a low cost, extensive engine testing prior to actual flight compared to toxic propellant alternatives; 3) is stable and storable over a very wide range of temperatures and environmental conditions; 4) is <30% of the overall length of an equivalent conventional bell nozzle engine, ~90% of the diameter, and allows high density packaging of mono/bipropellant systems into compact launch configurations reducing propulsion system volume and mass; 5) can be thrust-vectorred to remove a separate engine gimbal requirement; and 6) utilizes an atmosphere-compensating nozzle allowing for significant mass savings and consistent performance over a wide range of altitudes.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Firestar Engineering, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
Firestar Engineering, LLC	Lead Organization	Industry	Mojave, California
● Armstrong Flight Research Center(AFRC)	Supporting Organization	NASA Center	Edwards, California

Primary U.S. Work Locations

California

Project Transitions

**January 2010:** Project Start**July 2010:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140582>)

Project Management

Program Director:

Jason L Kessler

Program Manager:

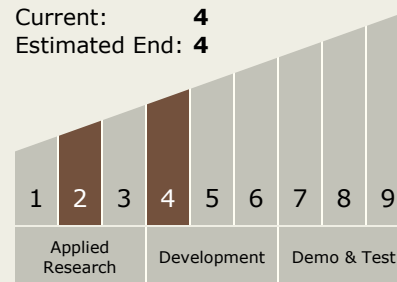
Carlos Torrez

Principal Investigator:

Greg S Mungas

Technology Maturity (TRL)

Start: 2
Current: 4
Estimated End: 4



Technology Areas

Primary:

- TX01 Propulsion Systems
 - TX01.1 Chemical Space Propulsion
 - TX01.1.3 Cryogenic

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System